PROVINCE OF ALBERTA

HIGH SCHOOL AND UNIVERSITY MATRICULATION EXAMINATIONS BOARD

DEPARTMENTAL EXAMINATIONS, 1939

BIOLOGY 1

Time—2½ hours.

Values

3 **1.** (*a*) Describe in detail what you would observe if you placed a drop of water containing Volvox on a slide and examined it under the microscope.

3 (*b*) "Spirogyra is a simple plant community whereas Pandorina is a colonial organism." Explain this statement.

2 (*c*) Show how sexual reproduction in Spirogyra differs from sexual reproduction in the higher animals.

2 **2.** (*a*) How is division of labor illustrated by digestion in Hydra?

2 (*b*) In what *two* respects does the body plan of the Earthworm show an advance over that of Hydra?

1 (*c*) Why is an animal like Hydra said to be hermaphrodite?

3 (*d*) Describe the structure of the respiratory organs of an insect.

3 **3.** *Either* (*a*) Why is the frog called (1) an amphibian, (2) a pentadactyl vertebrate?

1 (*b*) Explain clearly why the frog is called a cold-blooded animal.

2 (*c*) Describe the movements involved in the breathing of the frog.

2 (*d*) Outline *two* experiments which have shown that the thyroid gland is necessary for normal development of the frog.

8 *Or* Homologous organs or parts are alike in their fundamental structure and mode of development.

Discuss this topic in a general manner as it applies to the various animals you have studied. Be certain to give specific references, e.g. the pectoral fins of the fish are homologous with the arms of man.

3 **4.** (*a*) What evidence can be given in support of the statement, "The ancestors of all birds were reptiles"?

Values

2 (*b*) In what *four* ways are birds distinguished from all other animals?

1 (*c*) What characteristics of both birds and mammals are exhibited by the Platypus?

2 (*d*) In what ways is the structure of birds' eggs different from that of frogs' eggs?

2 **5.** (*a*) What substances are used in preparing Millon's reagent?
Describe what occurs when this reagent is used in testing for protein.

3 (*b*) There are valves (rings of circular muscles) at *three* places in the alimentary canal of mammals. Locate them and state the special function of *each.*

2 (*c*) Discuss the importance of peristalsis in the digestive tract.

1 (*d*) "In the rabbit the appendix is apparently a functional part of the digestive tract." State its function.

6. *Either*

4 (*a*) State the mutual benefits obtained by each organism in the following partnerships:
(1) Sea Anemone and Hermit Crab.
(2) Hydra viridis and the unicellular Alga (Chlorella vulgaris).

3 (*b*) How may a growth of Mucor be obtained? Describe this mould in detail.

1 (*c*) Account for the "fairy rings" found in open woods and meadows.

Or

2 (*a*) What are the conditions necessary for osmosis?

4 (*b*) Describe an experiment to demonstrate root pressure. What part may root pressure play in the life of the plant?

2 (*c*) Outline an experiment with a plant to illustrate *one* tropism.

2 **7.** (*a*) How would you decide whether an underground part of a plant is a root or a rhizome?

4 (*b*) What is the difference in the general structure and function of the xylem and phloem vascular tissues?

2 (*c*) Briefly describe *four* modifications of the normal leaf structure for special functions.

2 **8.** (*a*) What parts of the flower gives rise to
(1) seed, (2) fruit?

2 (*b*) Explain the derivation of the core and the succulent tissue of the apple.

4 (*c*) Name and describe *four* kinds of dehiscent fruits.

4 **9.** (*a*) By what *four* characteristics would you decide whether a given plant belongs to the Rosaceae or the Cruciferae?

2 (*b*) How can it be shown that seeds respire?

2 (*c*) Mention *two* important ways in which plants that live in water differ from land plants.

Note—Write your answers to the remaining questions on this printed sheet. Detach the sheet and enclose it in the envelope with your answer paper.

Values

7 **10.** Under the two columns shown, write the correct word or phrase that makes the comparison.

	Photosynthesis	*Respiration*
Gas used	....	....
Gas given off	....	....
Occurs in what cells	....	....
Time of day	....	....
Waste products	....	....
Relation to energy	....	....
Relation to food	....	....

5 **11.** Classify the following as enzyme, hormone, or neither. Place "E" after each enzyme, "H" after each hormone, and "N" to signify neither "E" nor "H".

secretin ....,
ptyalin ....,
lipase ....,
bile ....,
thyroxin ....,
pepsin ....,
insulin ....,
fibrinogen ....,
pituitrin ....,
adrenalin ....,
diastase ....,
chyle ....,
trypsin ....,
rennin ....,
amino-acids ....

10 **12.** Make a simple drawing to illustrate each of the following:

(1) Parietal placentation

(2) Cross section of a monocotyledonous stem

(3) A pinnately compound leaf

(4) The embyro in a seed

[OVER]

Values

(5) The gill of a fish

(6) Diadelphous stamens

(7) The foot of a wading bird

(8) The stomach of a ruminant

(9) Syngenesious stamens

(10) A fruit that is a double samara.

6 **13.** In the brackets before each phrase in the left-hand column, write the number of the appropriate name from the right-hand column.

Example:

(15) A self-pollinated flower which never opens — 15. cleistogamous

(*a*) ( ) A flower in which the pistil occupies the apex of the receptacle.
(*b*) ( ) A flower with a papilionaceous corolla.
(*c*) ( ) Flowers with joined petals.
(*d*) ( ) A cell which unites with another cell to form a zygote.
(*e*) ( ) An asexual reproductive cell.
(*f*) ( ) An animal that walks on the sole of the foot.
(*g*) ( ) The prenatal period in mammals.
(*h*) ( ) The membrane that holds the alimentary tract in place.
(*i*) ( ) The delicate connective tissue that encloses the heart.
(*j*) ( ) The process that involves a release of kinetic energy in the mammalian body.
(*k*) ( ) The air-sacs found in the lungs.
(*l*) ( ) A soluble protein present in the blood of mammals.

1. spore
2. pericardium
3. gamete
4. fibrinogen
5. superior
6. alveoli
7. plantigrade
8. katabolism
9. gestation
10. Leguminosae
11. mesentery
12. gamopetalous.

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